Surveillance of SARS-CoV-2 variants targeting SARS-CoV-2 spike protein mutations associated with variants of concern and variants of interest in the Central Province of Sri Lanka from November 2020 to November 2021

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Introduction and Objectives: Emergence of SARS-CoV-2 variants sharing common mutations like N501Y, E484K and L452R has resulted in increased transmissibility and decreased susceptibility to antibody-based neutralisation. This makes the need for identifying these variants and whole genome sequencing (WGS) the gold standard used to identify mutant strains. Although WGS is of high accuracy, it is labour-intensive, time-consuming, and expensive. Hence, resource limited countries are not able to use WGS for surveillance. The objective of the study was to detect mutations (N501Y, E484K and L452R) associated with variants of concern (VOC) and variants of interest (VOI) using single nucleotide polymorphism (SNP) real time RT-PCR.

Methodology: In total, 325 SARS-CoV-2 samples positive by real time RT-PCR for COVID-19 diagnosis (Ct < 30) were randomly selected from November 2020 to November 2021 from selected areas of the Central Province of Sri Lanka. They were subjected to an in-house SNP real time RT-PCR targeting N501Y, E484K and L452R using a maximum of 30 samples per month. For November 2020, March 2021, and October 2021 the specimens tested were 25, 12 and 6 respectively due to fewer number of positive samples with Ct < 30.

Results: From November 2020 to March 2021, we did not identify any of the SNP tested. N501Y was detected in the samples from April (29/30), May (30/30) and June (30/30) 2021. One sample with both N501Y and E484K mutation was identified in April 2021. From July to November 2021, L452R was the dominant mutation identified in the samples tested.

	Nov 2020 - Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug-Nov 2021
No. positive for SNP / No. tested	0/127	30/30	30/30	30/30	30/30	78/78
Type of SNP mutation	None	N501Y E484K	N501Y	N501Y	L452R	L452R N501Y
VOC / VOI	None	VOC/VOI	VOC/VOI	VOC/VOI	VOC/VOI	VOC/VOI
Possible variant	None	Alpha Beta Gamma Theta Zeta Eta Mu	Alpha Beta Gamma Theta Mu	Alpha Beta Gamma Theta Mu	Delta Epsilon Kappa	Delta Alpha Beta Gamma Theta Mu Epsilon Kappa

Conclusion: Based on the SNP surveillance, the mutations associated with VOCs and VOIs have been circulating in the study areas of the Central Province of Sri Lanka since April 2021. L452R has been the dominant mutation from July 2021.

Keywords: Single nucleotide polymorphism, SARS-CoV-2 variants, Central Province, Sri Lanka

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